



*Image*

1631

**PATENT APPLICATION**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Hiroyuki WATANABE et al.

Group Art Unit: 2316

Application No.: 09/995,626 ✓

Examiner: A. Marschel

Filed: November 29, 2001

Docket No.: 111242

For: ELECTRICAL CONNECTION STRUCTURE, PRODUCTION METHOD THEREOF,  
AND ELECTRIC WIRING METHOD

**SUPPLEMENTAL RESPONSE**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In reply to the July 29, 2003 Office Action and the March 23, 2004 Communication,  
please consider the following:

Claims 1-16 and 18-21 are pending in this application, claims 8-13 having been  
withdrawn from consideration as drawn to a non-elected species.

Applicants appreciate the courtesies shown to Applicants' representative by Examiner  
Marschel in the October 28, 2003 personal interview. Applicants' separate record of the  
substance of the interview is incorporated into the following remarks.

**I. Claim Objections**

The Office Action objects to claim 17 as being of improper dependent form for failing  
to further limit the subject matter of a previous claim. By this Amendment, claim 17 has been  
canceled. Accordingly, withdrawal of this objection is respectfully requested.

**II. Rejection Under 35 U.S.C. §112, Second Paragraph**

The Office Action rejects claims 1-7 and 14-17 under 35 U.S.C. §112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention. Applicants respectfully traverse this rejection.

By this Amendment, claim 17 has been canceled. Thus, Applicants respectfully submit that this rejection is moot as to claim 17 and should be withdrawn.

Claims 1, 8, 11, 14 and 15 have been amended herein to clarify that a direct electrical connection is formed between the carbon nanotube electrode and the biopolymer.

Thus, Applicants respectfully submit that claims 1-7 and 14-16 are not indefinite. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

**III. Rejection Under 35 U.S.C. §102**

**A. U.S. Patent 5,866,434 to Massey et al.**

The Office Action rejects claims 1-7, 14, 16 and 17 under 35 U.S.C. §102(b) and §102(e) over U.S. Patent 5,866,434 to Massey et al. By this Amendment, claim 17 has been canceled. Thus, Applicants respectfully submit that this rejection is moot as to claim 17 and should be withdrawn. Applicants respectfully traverse this rejection with respect to claims 1-7, 14 and 16.

Independent claim 1 sets forth a "production method of an electrical connection structure, the method comprising the steps of: providing at least one carbon nanotube as an electrode; and contacting the electrode with a biopolymer, wherein the electrode and the biopolymer are fixed together in an electrically connected state." Independent claim 14 sets forth an "electric wiring method, comprising the step of connecting at least one carbon nanotube provided as an electrode to a biopolymer such that the electrode and the biopolymer are fixed together in an electrically connected state."

In order to anticipate a claim, the reference must disclose, in specific embodiments, all limitations of the claim. That is, a prior art reference anticipates the claimed invention only where all claimed elements or steps of the claimed invention are disclosed, either expressly or inherently, in the reference. Scripps Clinic & Research Foundation v. Genentech, Inc., 927 F.2d 1565, 1576, 18 USPQ2d 1001, 1010 (Fed. Cir. 1991); In re Marshall, 577 F.2d 301, 198 USPQ 344 (CCPA 1978). Massey does not disclose, in specific embodiments, each and every limitation of the invention of independent claims 1 and 14 or their respective dependent claims, and thus cannot anticipate claims 1-7, 14 and 16.

Massey discloses carbon nanotubes used as electrochemiluminescence-based biosensors. As such, the carbon nanotubes supply electricity to electrochemical reactions, which produce luminescent biochemicals. Massey does not disclose an electrical connection structure in which carbon nanotube electrodes are fixed to a biopolymer in an electrically connected state. Massey further discloses that its enzyme biosensor systems can only be used once, unless the biosensors are immobilized and recovered. See Massey, col. 41, lines 58-64. Presumably, the recovered biosensors can be reused by reforming the Massey system.

In contrast, the carbon nanotube electrodes of claims 1 and 14 are not only fixed to the biopolymers in an electrically connected state, but also are stably connected. That is, the production method of claim 1 and the electrical wiring method of claim 14 produce stably connected structures that can be used for a variety of applications without being refabricated after each use. Accordingly, Massey does not disclose a production method or an electrical wiring method for such an electrical connection structure, as in claims 1 and 14, respectively.

Thus, Massey does not disclose every limitation of claims 1 and 14. Claims 2-7 depend from claim 1 and include all of the limitations of claim 1. Similarly, new claims 18-21 depend from claim 1 and include all of the limitations set forth therein. Claim 16 depends from claim 14 and includes all of the limitations of claim 14. Therefore, for at least

the same reasons as discussed with respect to claims 1 and 14, Massey does not disclose every limitation of claims 2-7, 16 and 18-21.

Accordingly, Applicant respectfully submits that claims 1-7, 14, 16 and 18-21 are patentable over Massey. Reconsideration and withdrawal of this rejection are respectfully requested.

**B. U.S. Patent 6,576,341 to Davey et al.**

The Office Action rejects claims 1, 2, 4, 5, 7, 14 and 17 under 35 U.S.C. §102(e) over U.S. Patent 6,576,341 to Davey et al. By this Amendment, claim 17 has been canceled. Thus, Applicants respectfully submit that this rejection is moot as to claim 17 and should be withdrawn. Applicants respectfully traverse this rejection with respect to claims 1, 2, 4, 5, 7 and 14.

Independent claims 1 and 14 are as set forth above.

Davey discloses a process for extracting carbon nanotubes from the "soot" in which they are formed. Polymers such as DNA are useful in this process because of their coiling structure. Davey, col. 3, lines 31-32. Davey teaches contacting coiling polymers with carbon nanotubes to extract the nanotubes from the "soot."

Davey does not disclose contacting a carbon nanotube provided as an electrode with a biopolymer. Davey also does not disclose contacting a carbon nanotubes provided as an electrode with a biopolymer such that the carbon nanotube electrode and the biopolymer are fixed together in an electrically conductive state. Davey does not disclose the production method of an electrical connection structure as in claim 1 or the electrical wiring method of claims 14.

Thus, Davey does not disclose every limitation of claims 1 and 14. Claims 2, 4, 5 and 7 depend, directly or indirectly, from claim 1 and include all of the limitations of claim 1. Similarly, new claims 18-22 depend from claim 1 and include all of the limitations set forth

therein. Therefore, for at least the same reasons as discussed with respect to claim 1, Davey does not disclose every limitation of claims 2, 4, 5, 7 and 18-21.

Accordingly, claims 1, 2, 4, 5, 7, 14 and 18-21 are patentable over Davey.

Reconsideration and withdrawal of this rejection are respectfully requested.

#### **IV. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-16 and 18-21 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Julie M. Seaman  
Registration No. 51,156

JAO:JMS/jcp

Date: March 30, 2004

**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
--